EPA's New Cooling Water Intake Structure Rule For Existing Facilities CWA §316(b)

TDEC Seminar:
Cooling Water Intake Structures & NPDES Permits
March 10, 2015

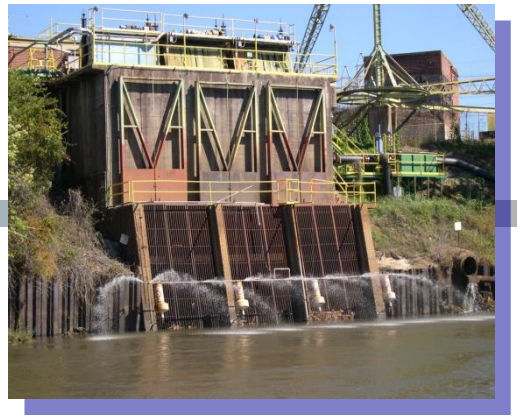
New Rule Published August 15, 2014

Rule Objective…

- To promulgate rules addressing Clean Water Act Section 316(b)
- To specify Best Technology Available (BTA) that will reduce adverse environmental impact (AEI) attributable to fish and shellfish impingement mortality (IM) on CWIS screens and entrainment mortality (EM) due to transit through the power/manufacturing facility cooling water system.

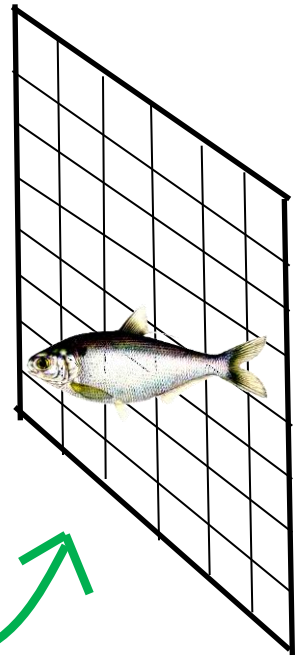
AEI is the default assumption – limited opportunity to demonstrate otherwise

The Primary Issues…

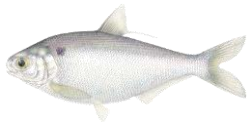


The mortality (death) of fish due to:

1. **Impingement** – The capture/entrapment of fish on the outer structure of the intake structure or against a screening device.



Juvenile & adult fish retained by screen mesh with max opening of 0.56 in (ex. 3/8-inch mesh).

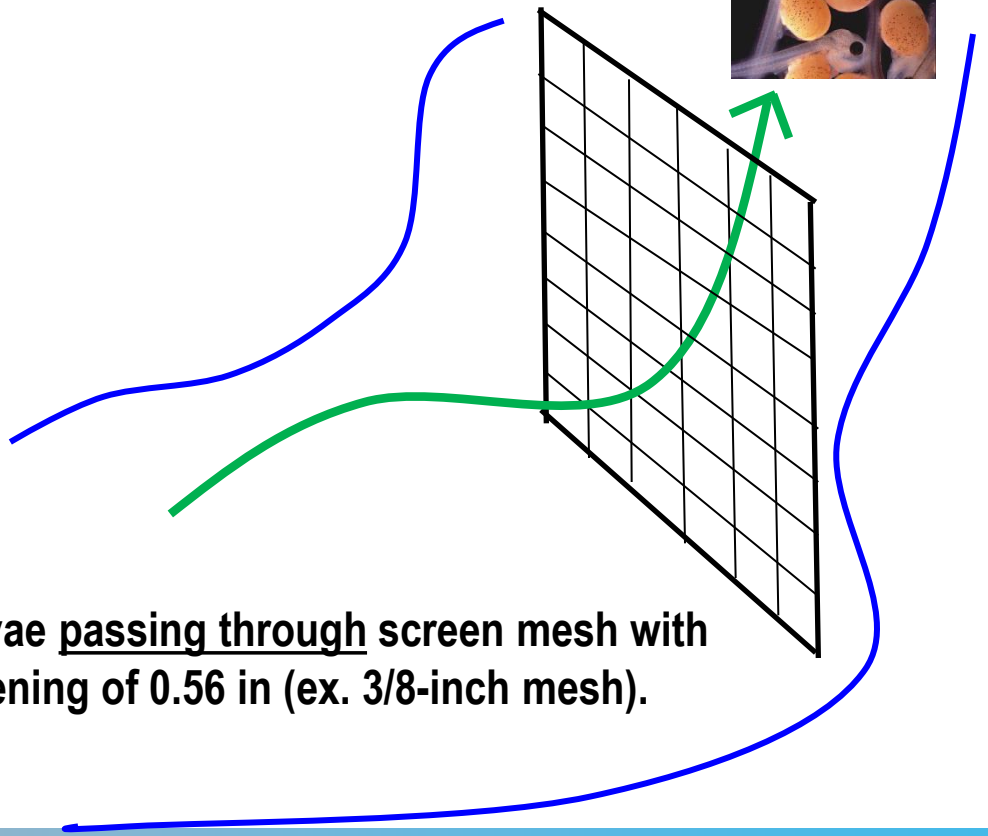


Gizzard Shad (*Dorosoma cepedianum*); a commonly impinged species.

The Primary Issues…

The mortality (death) of fish due to:

2. **Entrainment** – The incorporation of fish (eggs & larvae) with the intake flow entering and passing through the intake structure and into the cooling system.



Eggs & larvae passing through screen mesh with max opening of 0.56 in (ex. 3/8-inch mesh).

Rule Applicability …

- **Existing NPDES-permitted Power Generating and Manufacturing facilities; and New Units/Process Lines at such facilities.**
- **Facility has a cumulative design intake flow (DIF) > 2 MGD and ≥ 25% actual flow used for cooling purposes.**
- **Cooling water used in manufacturing process before/after use as cooling water not counted toward 25% threshold.**
- **For DIF ≤ 2 MGD, §316(b) implemented a "case-by-case", best professional judgment (BPJ) basis.**

New Unit: the addition of a new stand alone unit at an existing facility – may have new dedicated CWIS, or uses existing or modified CWIS.

Information Requirements for All Facilities

- All facilities with > 2 MGD design intake flow must submit information under §122.21(r)(2)-(8):

  r(2) - Source water physical data;

  r(3) - Cooling water intake structure data; and applicable provisions of….

  r(4) - Source water baseline biological characterization data;

  r(5) - Cooling water system data;

  r(6) - Chosen method of compliance with IM standard;

  r(7) - Entrainment Performance studies (if any); and

  r(8) - [Unit(s)] operational status.

Additional Requirements for Larger Facilities

- Facilities with > 125 MGD actual intake flow must conduct & submit:

  r(9) - Entrainment Characterization Study (two years);

  r(10) - Comprehensive Technical Feasibility and Cost Evaluation Study (must evaluate closed-cycle cooling, fine-mesh screens & alternate cooling water sources);

  r(11) - Benefits Valuation Study; and

  r(12) - Non-Water Quality and Other Environmental Impacts Study.

- Peer review required for items r(10)-(12) above.

Rule Requires …

- **BTA for reducing Entrainment Mortality be determined site-specifically (if Actual Intake Flow > 125 MGD) by state regulators who must consider these factors:**
  - Numbers and types of organisms entrained
  - Impact of changes in emissions associated with entrainment technology
  - Land availability for technology (e.g., cooling towers)
  - Remaining useful plant life
  - Social benefits and costs of available technologies

- **Factors that may be considered:**
  - Entrainment impacts on waterbody
  - Thermal discharge impacts
  - Credit for flow reductions associated with unit retirements occurring in past 10 years.
  - Impacts on water consumption
  - Availability of process, gray, waste, etc. water for reuse as cooling water.

Weight given to each factor is Director's discretion - outcome could range from existing technology is BTA to cooling towers or fine-mesh screens

What If Actual Intake Flow is ≤ 125 MGD?

- Directors have the flexibility to consider entrainment impacts for facilities with AIF ≤125 MGD.
- Rule does not *require* 122.21(r)(9)-(11) studies be conducted.
- Directors could ask for Entrainment Characterization "(r)(9)" where they feel insufficient information exists to exclude any requirement for entrainment reduction.
- Only documentation informing BTA decision for entrainment could be 122.21(r)(2)-(8) studies … completeness/quality will be important.
- Director could possibly issue a permit stating the existing CWIS is BTA, but include a requirement for entrainment monitoring and then decide on the need for further action in the next permit.

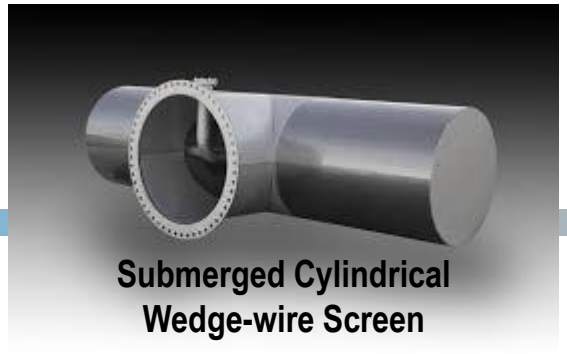
Rule Also Requires …

- **BTA for reducing Impingement Mortality and provides flexibility of selecting from seven compliance alternatives:**

1. Closed-cycle cooling
2. 0.5 ft/sec *Design* velocity standard {no monitoring}
3. 0.5 ft/sec *Actual* velocity standard {monitoring required}
4. Existing offshore velocity cap
5. Modified traveling screens {two-year optimization study}
6. System of technologies/practices/measures {monitoring required}
7. Impingement mortality standard { ≤24% rolling annual average mortality}

If closed-cycle cooling is specified as BTA for entrainment, impingement satisfied too.

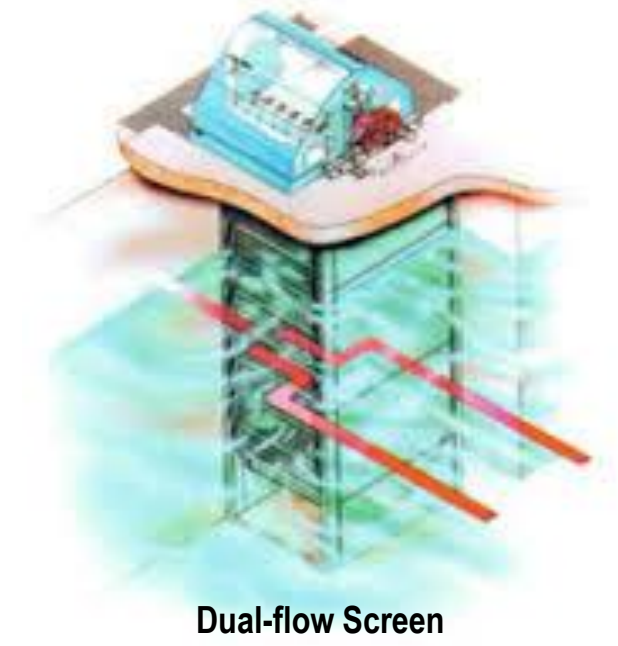
Screen Technologies…



Submerged Cylindrical Wedge-wire Screen

Hydrolox Polymer Screen

Beaudrey WIP Screen



Dual-flow Screen

Geiger Rotary Disc Screen

Pictures from various web sources

For New Units/Process Lines - Rule Requires …

- BTA for reducing Entrainment Mortality and Impingement Mortality tracks requirements for New Facilities (Phase I Rule):
  - Reduce Design Intake Flow to level commensurate with closed-cycle cooling; or
  - If using alternative technology, demonstrate entrainment reductions equivalent to 90% that of closed-cycle cooling.

The Director may …

- Require additional measures where Threatened & Endangered (T&E) species and/or critical habitats are present.
- Exclude fragile species (e.g., gizzard shad) from IM consideration; if excluded, still may require additional measures.
- Make decision that IM is *de minimis* and IM controls not needed.
- Waive some or all information requirements if facility is located on a manmade lake or reservoir and fisheries stocked and managed; except where T&E or Critical Habitats are present.
- Reduce requirements for units with collective CUR of <8%
- For nuclear facilities, deviate from requirements in conflict with safety.

Compliance Schedule

- Rule became effective October 14, 2014 – the process has begun.
- Entrainment compliance is determined first; informs Impingement BTA.
- Compliance linked to NPDES permit renewal cycles:
  - Permit expiring prior to or on July 14, 2018 (all TVA facilities) - may request alternate schedule for information submittal if justified & may include conditions to ensure information is collected for compliance in the subsequent permit.
  - Permit expiring after July 14, 2018 - submit required information 180 days prior.
  - Permit expiring before rule effective date (October 14, 2014) - may include conditions to ensure information is collected to achieve compliance in the subsequent permit.

Involvement of U.S. Fish & Wildlife Service

- Director must:
  - transmit all permit applications to the U.S. Fish & Wildlife Service for a 60-day review prior to Public Notice;
  - provide U.S. Fish & Wildlife Service comment opportunity during Public Notice;
- Director may:
  - include requirements for additional studies of threatened and endangered species arising from U.S. Fish & Wildlife Service comments;
  - require additional measures be taken to protect threatened and endangered species and critical habitats.

Affected TVA Facilities in Tennessee:

- TVA Operates 6 Coal, 1 Gas, and 2 Nuclear Power Plants in TN Affected by the Rule:
  - John Sevier – Holston River
  - Bull Run – Melton Hill
  - Kingston – Watts Bar
  - Gallatin – Old Hickory
  - Johnsonville – Kentucky Lake
  - Cumberland – Barkley
  - Allen – McKellar Lake
  - Watts Bar – Chickamauga
  - Sequoyah – Chickamauga

- Water withdrawals range from ~8 MGD to 2,729 MGD

Perspective…

Tennessee's lakes and rivers support some of the most diverse and abundant fish populations in the nation.

- **TVA's power plants are located on large rivers & man-made reservoirs….these facilities withdraw a small percentage of the available flow.**
- **TVA conducts extensive biological monitoring to evaluate potential impacts to the aquatic community from its operations – fishery resources are fully supported.**
  - **Compared to oceans, estuaries, and tidal rivers; the reproductive strategy of freshwater fishes makes their eggs and larvae less vulnerable to entrainment.**
  - **Gizzard shad & threadfin shad are the dominant (+80%) species impinged & entrained at TVA facilities. These fish are prone to cold-induced stress making them more vulnerable to impingement (i.e., they are fragile species).**
  - **Shad are very prolific; a single gizzard shad can produce as many as 100,000 eggs.**

TVA will continue to support & invest in aquatic resource health for Valley lakes & rivers.

Questions?

The entire §316(b) rulemaking, associated technical documents, and rule docket can be reviewed at:

- Rules:http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/index.cfm/
- Docket:http://www.regulations.gov/#!docketDetail;dct=FR+PR+N+O+SR;rpp=10;po=0;D=EPA-HQ-OW-2008-0667

-- The End --